

TATA BP SOLAR INDIA LIMITED



**USER MANUAL
FOR**

SOLAR WATER HEATING SYSTEMS



POWER OF THE SUN, WORKING FOR YOU

CAUTION

1. While commissioning cold water should be allowed into tank Only when the system is cool (i.e before 7AM or after 6PM only)
2. When the system is not in use for more than 7 days, drain out the water from the tank and cover the collector with thick cloth.

GENERAL INSTRUCTIONS

- READ this Manual thoroughly before **"USING THE SYSTEM"**. Observe the precautions detailed in the manual.
- Collector surface develops very high temperature. To avoid this, the collector should be shaded from the sun by opaque sheeting before making any internal piping connection.
- Do not use the hot water for drinking application.
- Do not touch the Collector surface / glazing during sunshine hours as it could lead to burn injury.

SECTION 1
INTRODUCTION ----- 1

SECTION 2
GENERAL INFORMATION ----- 2

SECTION 3
SYSTEM SPECIFICATION ----- 4

SECTION 4
INSTALLATION ----- 5

SECTION 5
MAINTENANCE ----- 5

SECTION 6
TROUBLE SHOOTING ----- 7

SECTION 7
SCHEMATIC LAYOUTS ----- 8-19

SECTION 8
HEALTH, SAFETY & ENVIRONMENT ----- 20

Congratulations on becoming a proud owner of Tata BP Solar's product.

TATA BP SOLAR INDIA LIMITED, the leader in Design, Development, Manufacturing and Marketing of Solar water heating and photovoltaic systems and it is promoted by the reputed TATA's in collaboration with world leader BP SOLAR of UK, the British Petroleum Group.

TATA BP SOLAR is in an unique position of being able to supply totally integrated solar thermal systems, comprising of various components viz; Solar collectors, Insulated Stainless Steel Storage Tank, Sacrificial Anode, Pumps and Pump Control Panel etc.

As a member of TATA GROUP, we are in position to enjoy substantial Technical, Marketing and Financial support. We are committed to provide a totally professional and reliable SERVICE Before, During and After SALES.

TATA BP SOLAR - THERMAL Systems have a wide spectrum of applications as below.

- | | |
|-----------------------------------|---|
| ● Domestic Uses | : Laundry, Cleaning, Bathing and other domestic Chores. |
| ● Industrial Applications | : Boiler Feed, Cleaning and Washing. |
| ● Hotels | : Bathing, Cleaning, Washing, Laundry and Swimming pool heating. |
| ● Educational Institutions | : Bathing, Cleaning and Washing. |
| ● Hospitals | : Washing, Cleaning, Bathing and Sterilization. |
| ● Dairies | : Washing cans & cattle and Boiler feed. |

2.0 ENERGY

Energy is the lifeblood of our society. Whatever the source - oil, coal, hydro, nuclear, gas- the use of energy is all-pervasive. Energy lights and heats our homes, offices, and factories. It powers machines in industries and transportation. The clothes we wear, the food we eat, the building we live and work in, the goods we produce such as dye, lubricant, metals, glass, plastic, and the services we render, such as transportation & communication - energy is inextricably woven into it all.

Energy can be classified into RENEWABLE and NON-RENEWABLE. It has become a reality that availability of Non-Renewable energy like fossils, hydro sites and even uranium is finite. Renewable energy is one, which is available in abundance and can be harnessed in an unlimited way.

Everyday Sun showers Earth with several thousand times the energy we use. In other words the entire stock of fossil fuels on earth is not worth more than few days of sunlight.

Solar energy can be effectively utilized in two ways - either by converting it into heat (Solar thermal) OR electricity (Solar photovoltaic). A flat plate collector is used to convert light energy into heat & a Solar Module is used to convert light energy into electricity.

2.1 BASIC SOLAR WATER HEATING SYSTEM

A Solar water system consists of following major components:

- A. Solar Collector(s)
 - B. Insulated Hot water Tank with Sacrificial Anode
 - C. Indicating and Control Instruments (optional at additional cost)
- 2.2 Solar radiation falling on the collectors passes through the glazing and is absorbed by the absorber consisting of fins, raisers and Headers. Water contained in the header & raisers gets heated up and becomes less dense than the water in the storage tank. On the principle of **"THERMOSYPHON"**, it starts rising through the collector and enters the top of the hot water tank. Simultaneously cold water from the tank descends to the bottom header of the collector, gets heated up in the absorber and rises back to the hot water tank and the cycle repeats.

The movement of heated water from the collector to the storage tank, placed above the collectors, is due to the difference of density only. No other moving parts are required in the system and hence the system reliability is very high.

The water retains its heat for a long time as the hot water storage tank is insulated to prevent heat loss. The sacrificial Anode provided in the hot water storage tank protects the system against Galvanic Corrosion.

2.3 WORKING PRINCIPLE OF ZING HEAT EXCHANGER SYSTEMS :

In Heat Exchanger System we have 2 loops. They are ;

1. Primary loop with soft water : Soft water / anti-freeze solution enters into the collector & gets heated. Then it enters Heat Exchanger where heat is lost, water cools and enters the collector again. This cycle is continuous throughout the day.
2. Secondary loop : Cold water enters at bottom gets heated when in contact with Heat Exchanger and leaves through the hot water outlet.

2.4 WORKING PRINCIPLE OF ZING PRESSURIZED SYSTEMS :

Zing pressurized systems also works similar to Zing systems. But the difference is that cold water outlet is connected to the bottom flange of the collector & the hot water outlet is taken from the top flange. The inlet water to the tank is pressurized. These systems are designed to work at 5 kg/cm² & if this pressure exceeds, the system may fail & the tank may burst. In such cases, the warranty is void.

3.1 SYSTEM SPECIFICATION :

1. System Capacity	:	
a] Zing	:	100LPD/200LPD/300LPD
b] Zing HHC	:	100LPD/200LPD/300LPD
c] Zing Pressurized	:	100LPD/200LPD/300LPD
2. System output temperature	:	60 deg.c.*
3. No. of Collectors	:	100 LPD - 1 no. 200 LPD - 2 nos. 300 LPD - 3 nos.
4. Circulation	:	Thermosyphon

* - Depends on the solar insolation at 5kW/sq.m./day & the usage conditions.

4.1 INSTALLATION GUIDELINES :

- Air vent as shown in the system schematic diagrams, is must for all installations except for pressurized systems where Air release valve has to be provided. Absence of Air vent OR Air release valve will damage the system & the same is not covered under warranty in such condition.
- System should be installed only by our authorized dealer / TBP representative as per layout given in this manual.
- Use only recommended pipe size for hot water external piping.
- Ensure proper insulation of complete hot water piping.
- External piping should not exceed 10 mtr. / 30 feet. If this exceeds, the system output will be reduced on account of increased heat losses in the pipe line.
- Immediately after installation, system must be filled with water. Otherwise, in case of heavy wind, system may topple.
- Grouting of the system is mandatory as shown in section 7

5.1 MAINTENANCE :

- Before the onset of monsoon, check the pipe and tank insulation for possible leakage. If damage has occurred to the tank or collector due to tampering, ensure that the water doesn't seep into the insulation. Use proper sealant like M-seal for joining the openings susceptible to water seepage.
- Once in a year drain the System by opening the cold-water outlet hose connected from tank bottom to collector inlet.
- Before draining, close the cold water Inlet gate valve.
- After draining & cleaning, fix the hose back with the cold-water outlet to the tank bottom; keep the cold water gate valve open once the cleaning is over.
- Draining should be done only in the evening when system is '**COOL**'.
- Once in a year check for corrosion of sacrificial anode. Replace it when found corroded.
- For HHC systems, the makeup tank has to be topped up with anti freeze solution OR soft water at regular intervals, if not, the system output will come down.

5.2 INSTRUCTIONS FOR OPERATION:

For optimum performance of the system, follow the Do's & Don't s given below.

Do's

- ☞ Ensure that the cold-water tank is always full and never runs dry.
- ☞ Ensure use of hot water once in a day either in the morning or in the evening.
- ☞ Ensure complete use of hot water within a span of 1 hour.
- ☞ Ensure that the **GATE VALVE** provided in the cold water line is always open.
- ☞ Clean the Collector Glass once in a week.
- ☞ Ensure that the Vent pipe is always open to atmosphere.

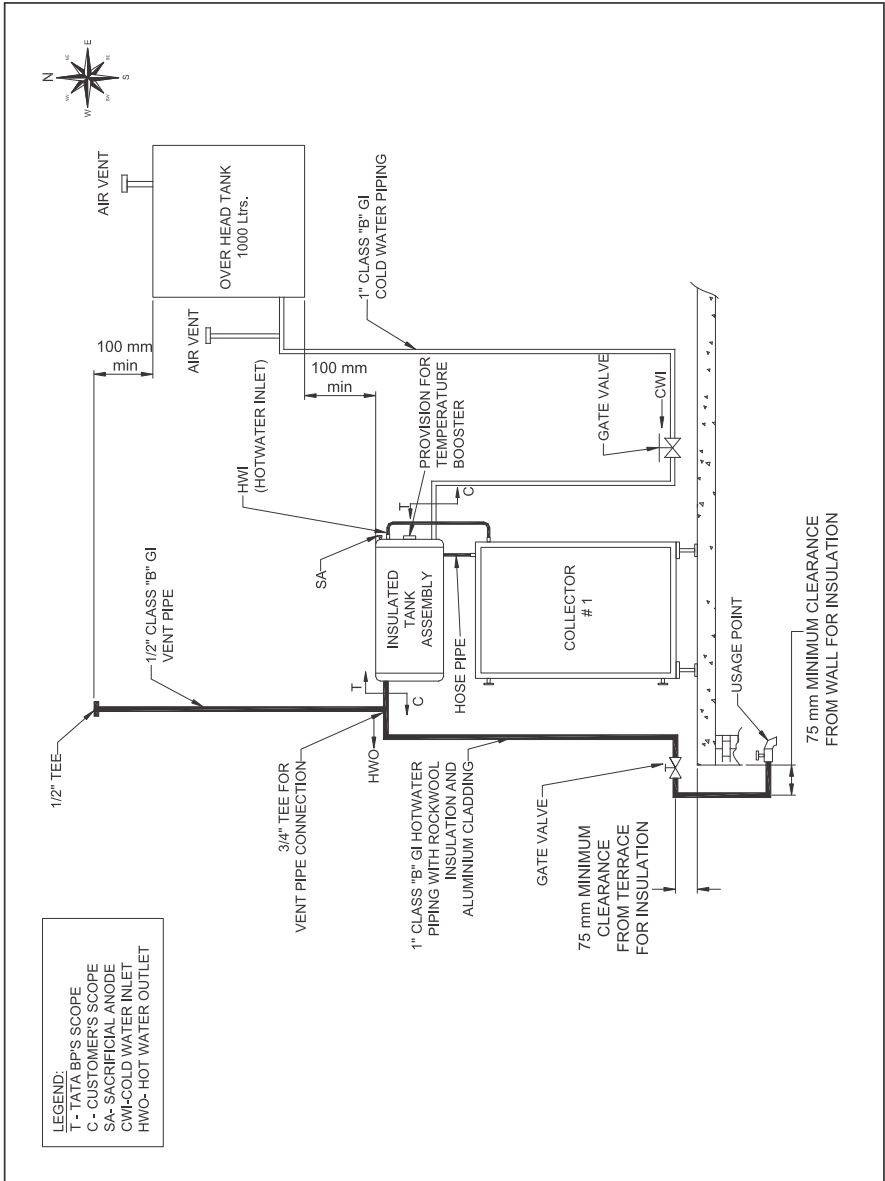
Don'ts

- ☞ Don't run the Collectors dry.
- ☞ Don't cover the Collectors when the system is in use.
- ☞ Don't erect any structures, which can cast shadow on the Collectors.
- ☞ Don't draw the hot water more than once in a day.
- ☞ Do not let the system unused for more than 7 days.

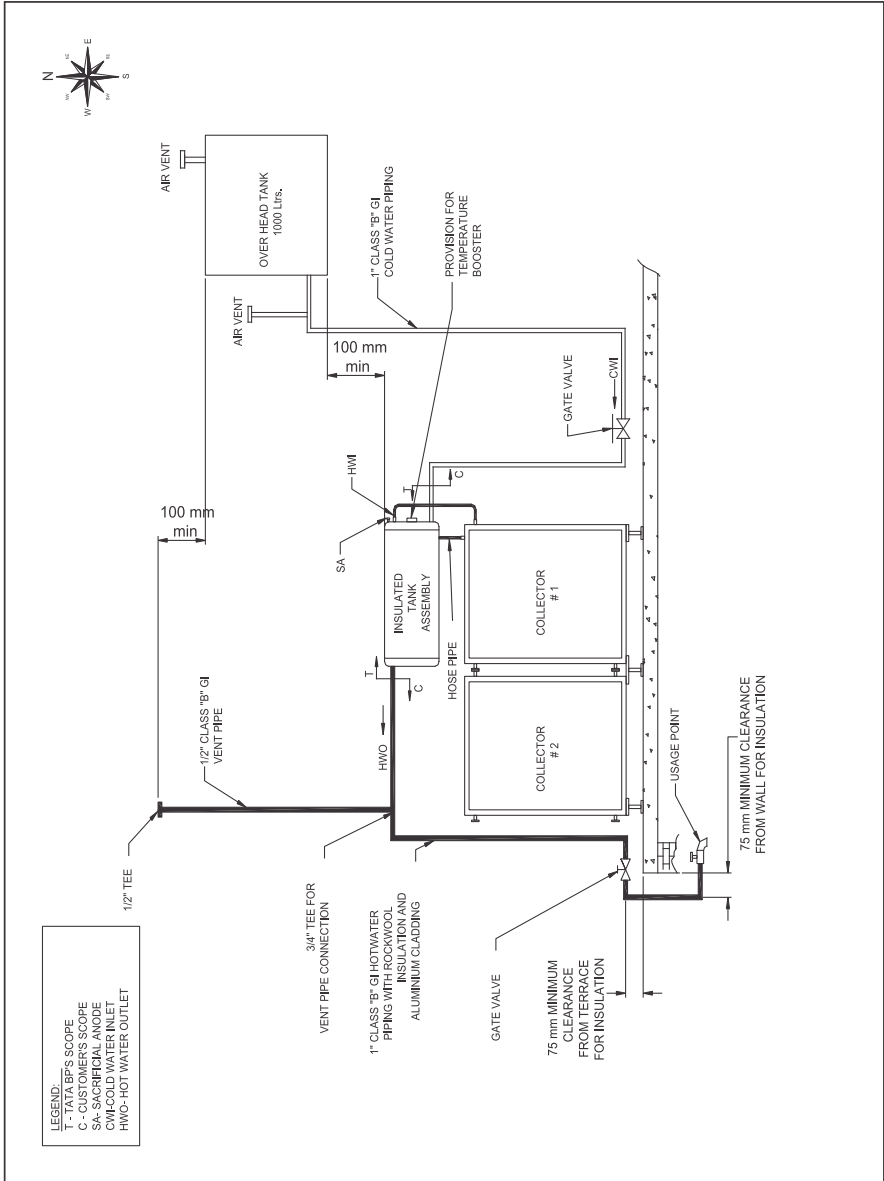
6.1 TROUBLE SHOOTING

SYMPTOM	COMPNT.	POSSIBLE CAUSE	CHECK / REMEDY
Not enough hot water	Collectors	1. Shading 2. Unclean glazing	1. Remove Shading 2. Clean Periodically with mild soap & water when cool.
	Piping	1. High heat losses. 2. Gate Valves Partially closed 3. Flow Blockage 4. No insulation	1. Check Insulation for splits, deterioration, absence. 2. Open Gate Valves. 3. Flush System. 4. Insulate the piping.
	Tank	1. High Storage losses. 2. Loss of hot water due to leakage.	1. Check Insulation 2. Check for any leakage.
No water at usage point	Piping	1. Gate Valve completely closed. 2. No hot water supply to the system 3. Flow blockage 4. Over head tank empty	1. Open Gate valve 2. Open cold water inlet Gate valve. 3. Flush System. 4. Fill up overhead tank.
Cold water at usage point	Piping	1. High heat losses / over usage.	1. Reduce the time interval between usage. Use complete quantity of hot water within a span of 1 hour once in 24 hours. Drain down cold water until hot water flows.
	Piping	1. Makeup tank empty	1. Fill the makeup tank with Antifreeze solution / Soft water
Leakage	Piping	1. Loose connection of pipe fittings.	1. Tighten the fittings properly.
	Collector	1. Damage to collectors.	1. Inform dealer / Tata BP.
	Tank	1. Damage to Tank.	1. Inform dealer / Tata BP.

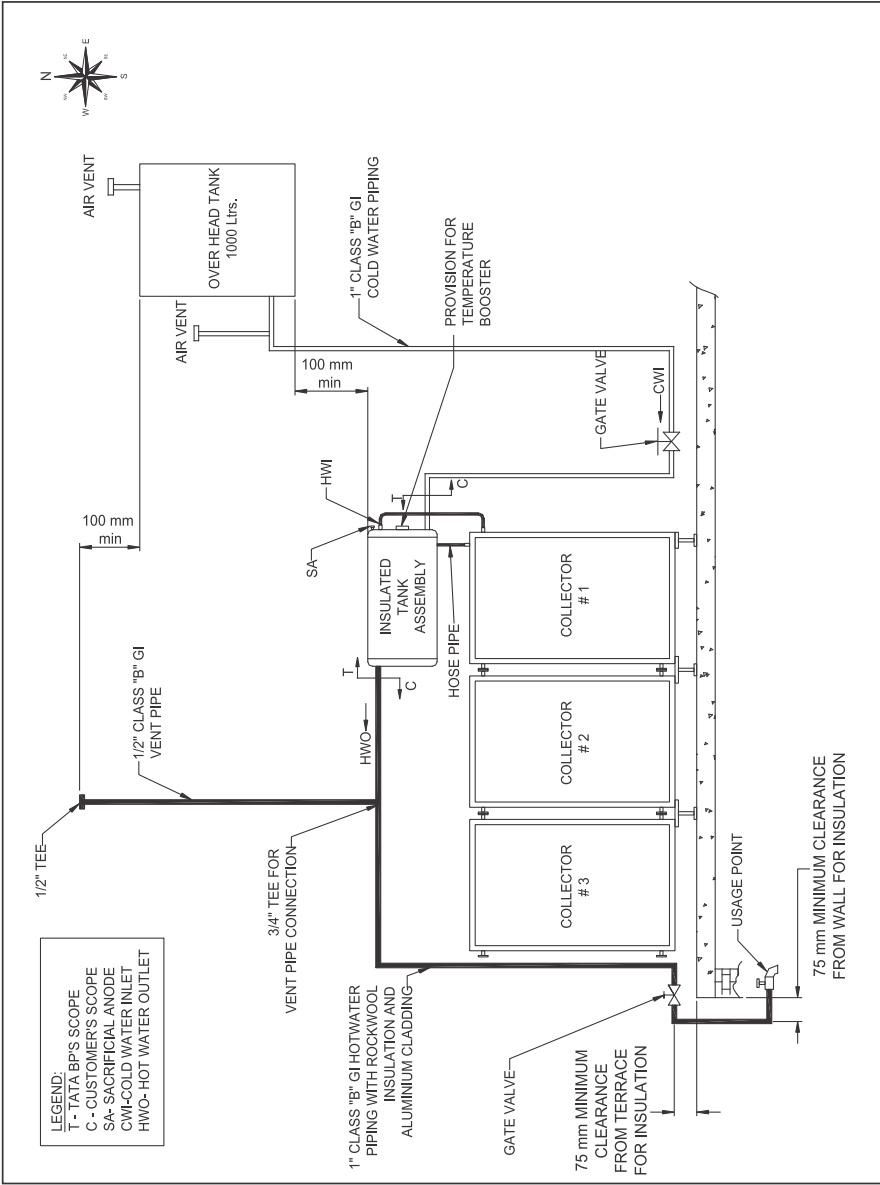
7.1 ZING SWH SYSTEM – 100 LPD



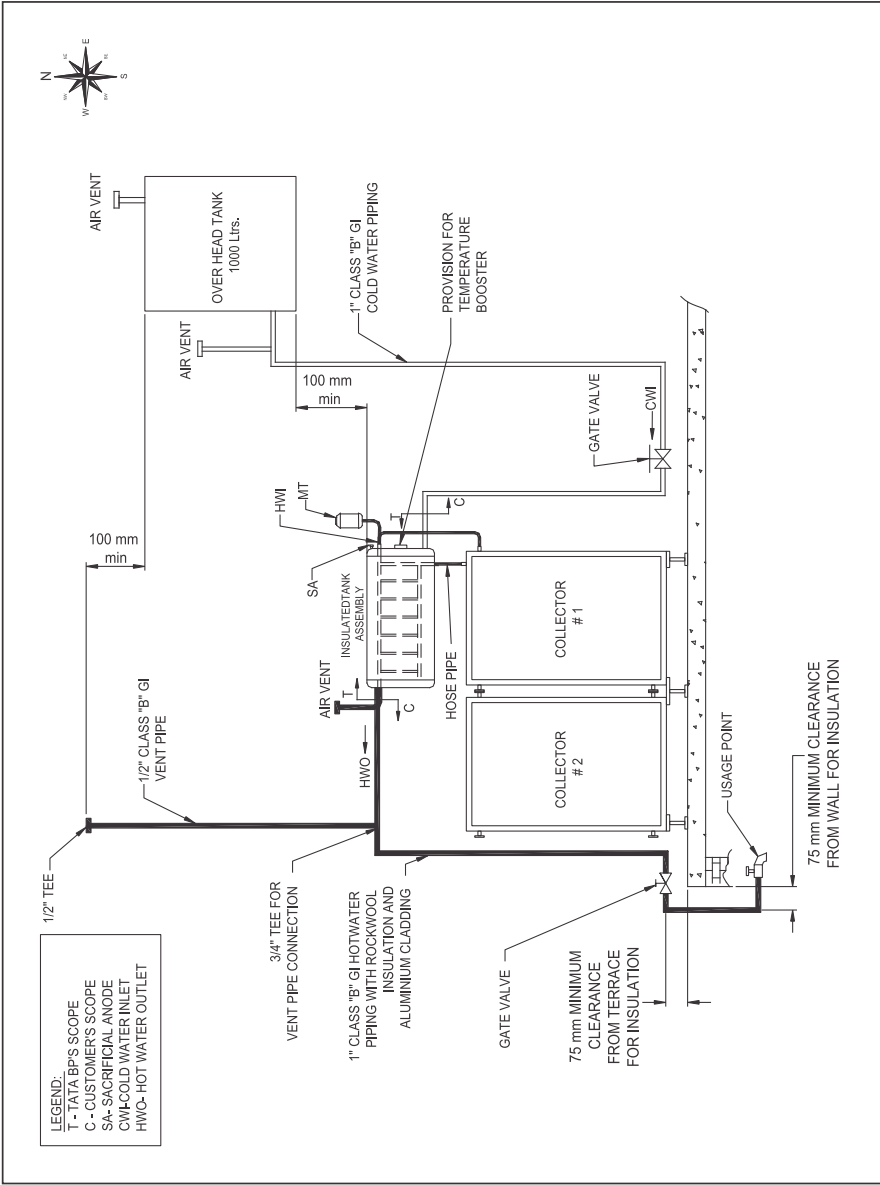
7.2 ZING SWH SYSTEM – 200 LPD



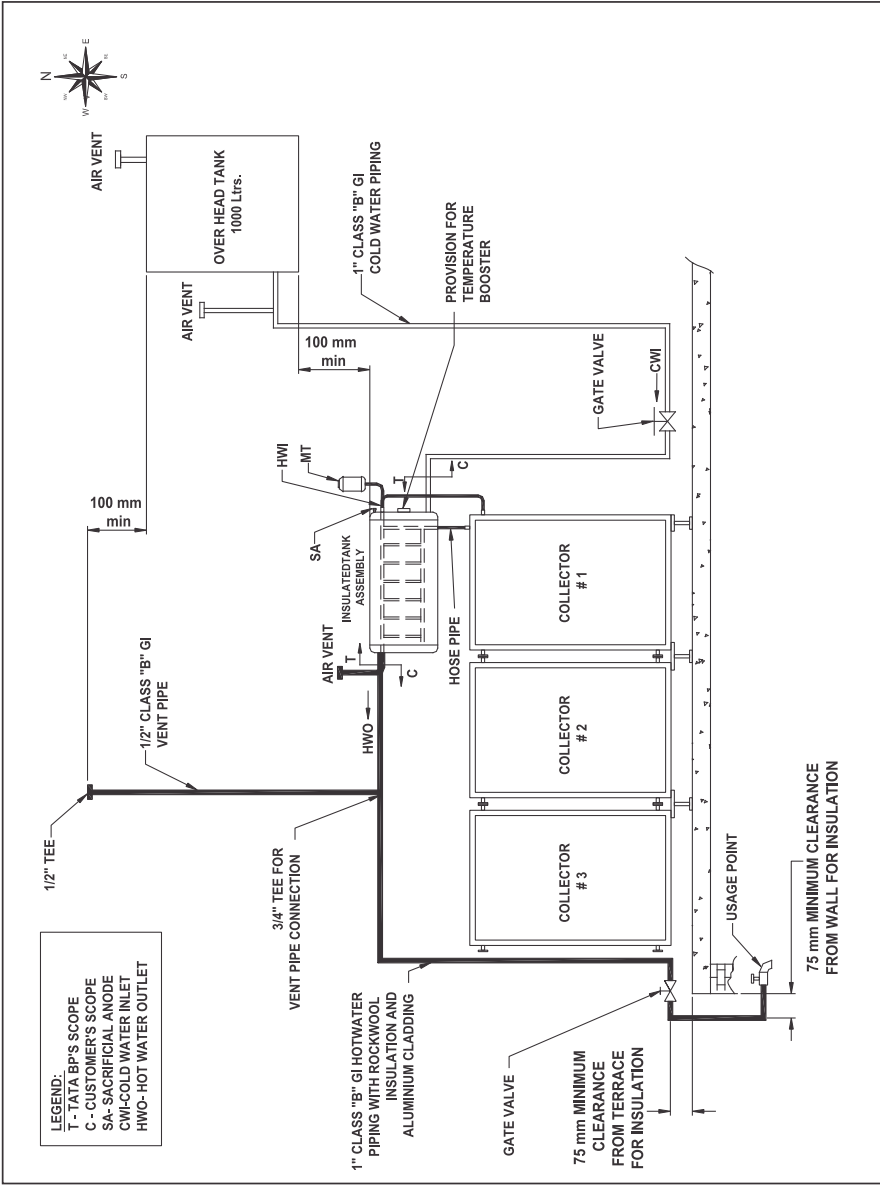
7.3 ZING SWH SYSTEM – 300 LPD



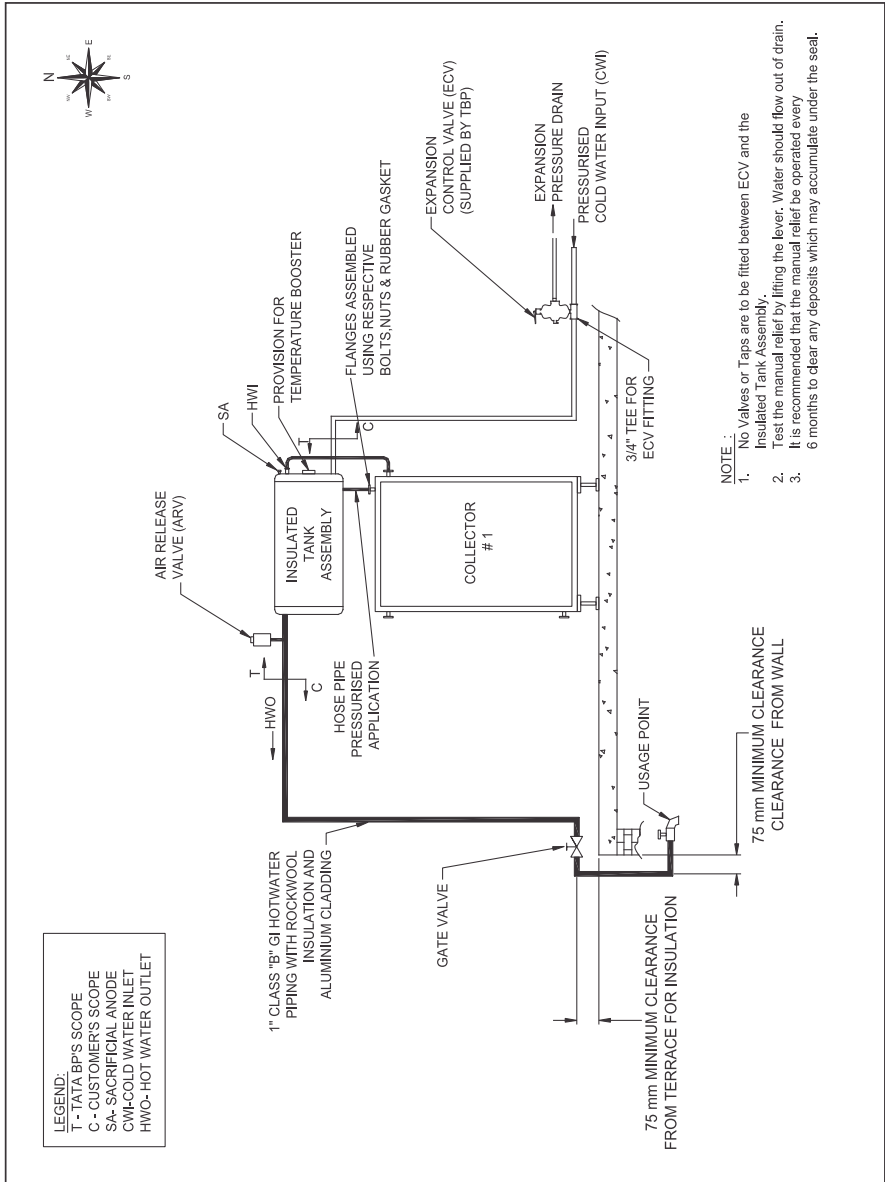
7.5 ZING HHC SWH SYSTEM – 200 LPD



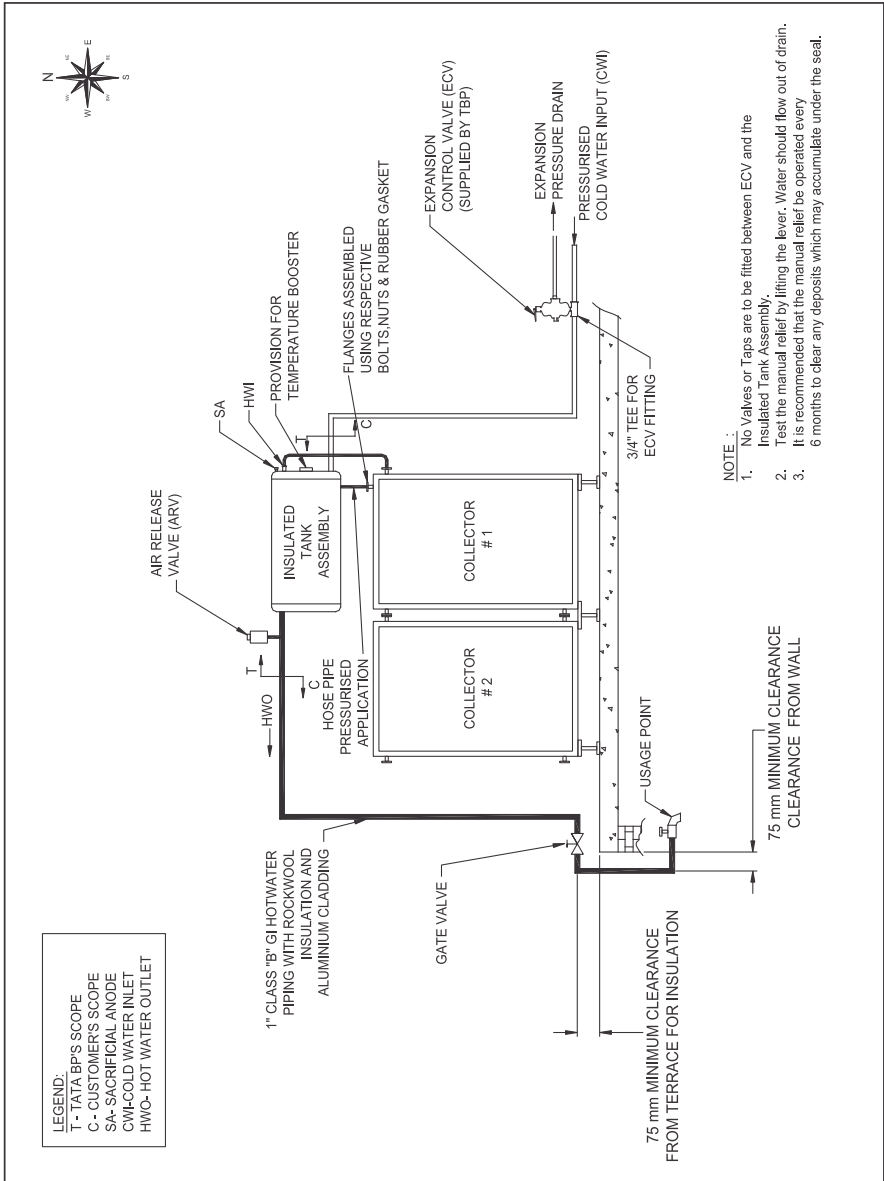
7.6 ZING HHC SWH SYSTEM – 300 LPD



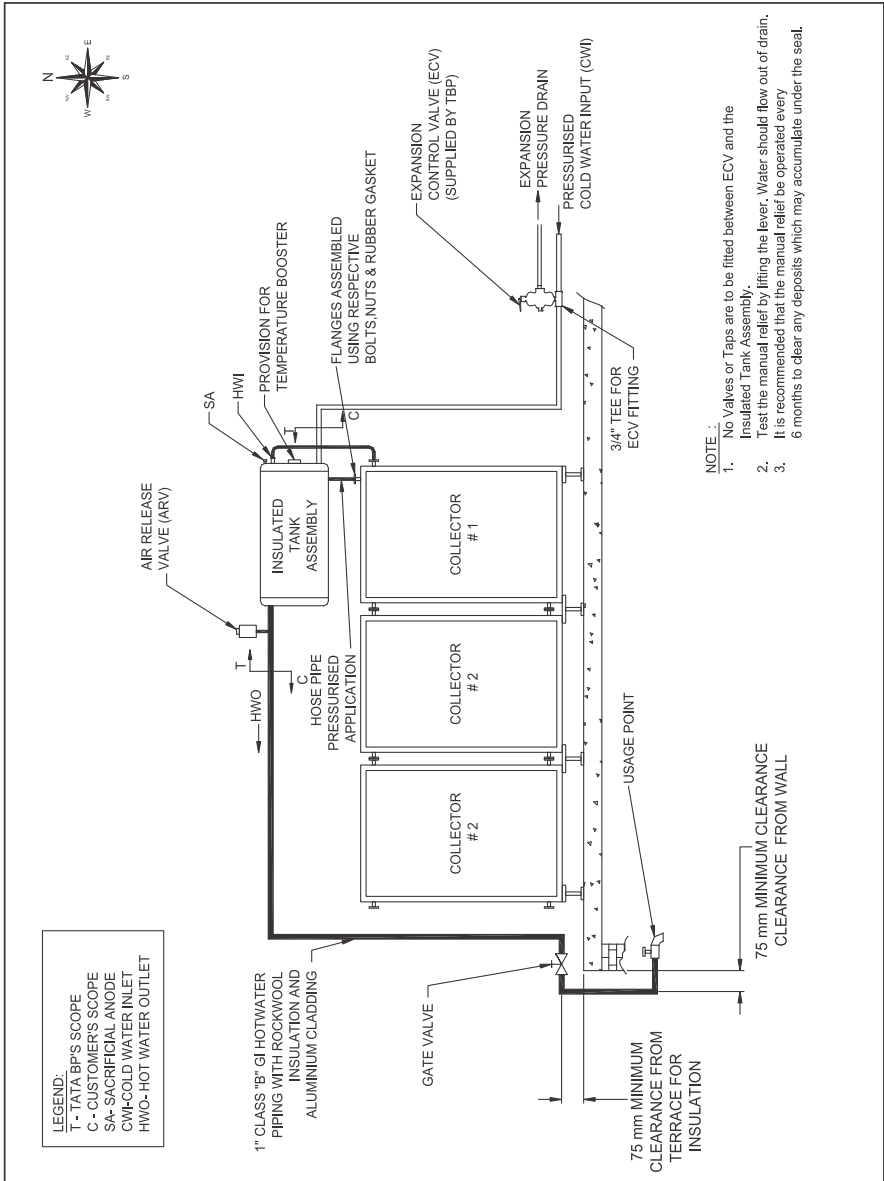
7.7 ZING PRESSURIZED SWH SYSTEM 100 LPD

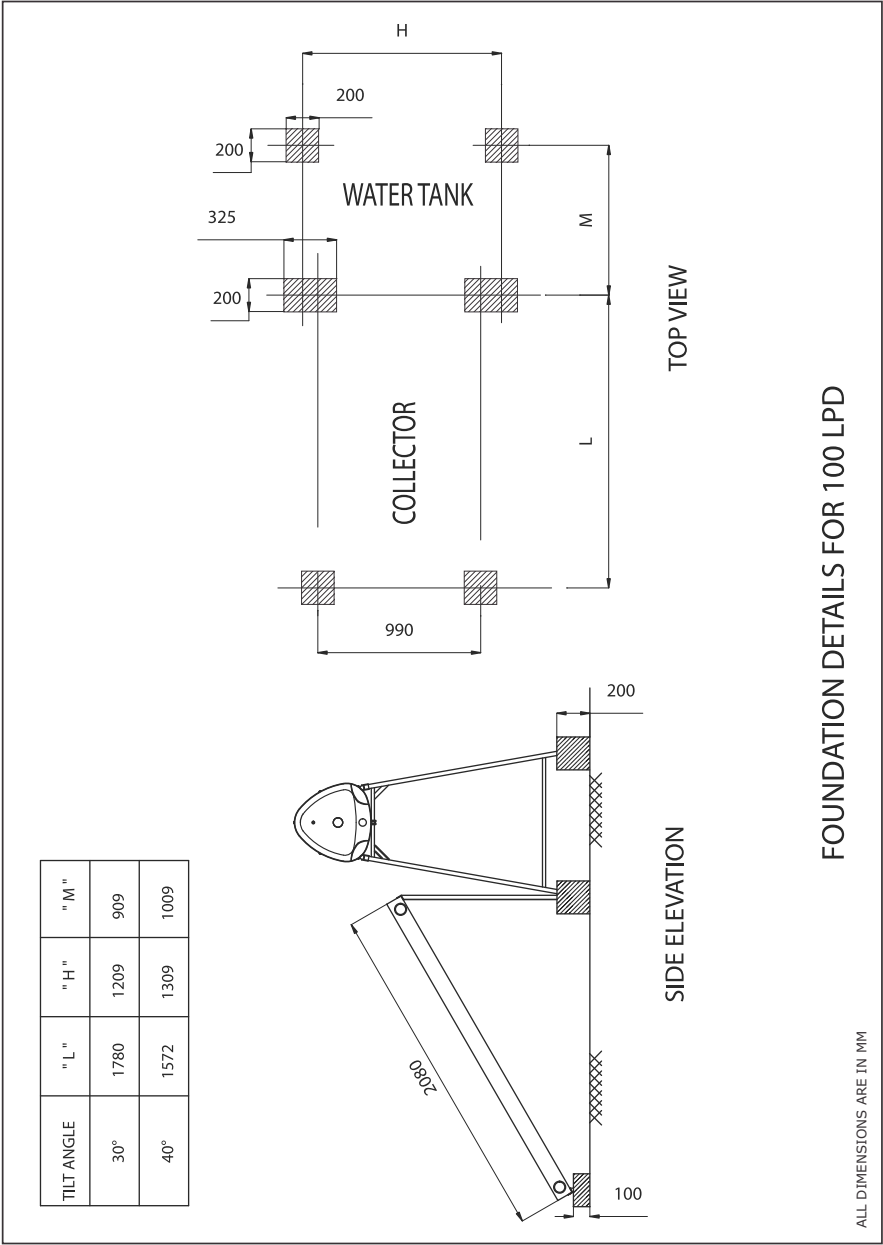


7.8 ZING PRESSURIZED SWH SYSTEM – 200 LPD

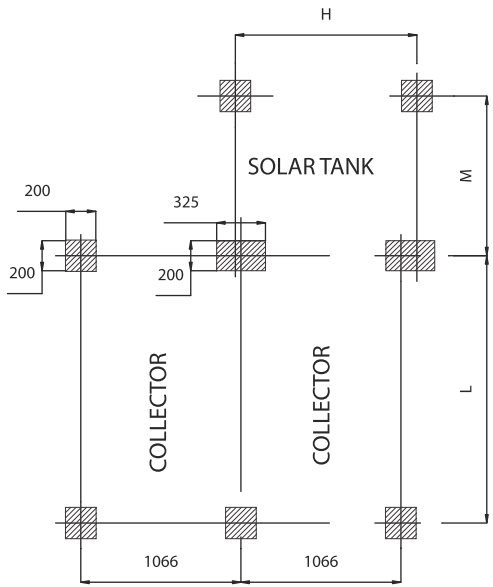


7.9 ZING PRESSURIZED SWH SYSTEM – 300 LPD

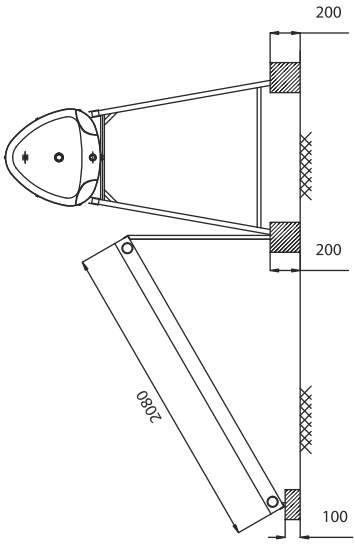




“TILT ANGLE”	“L”	“H”	“M”
30°	1780	1209	1064
40°	1572	1309	1164



TOP VIEW

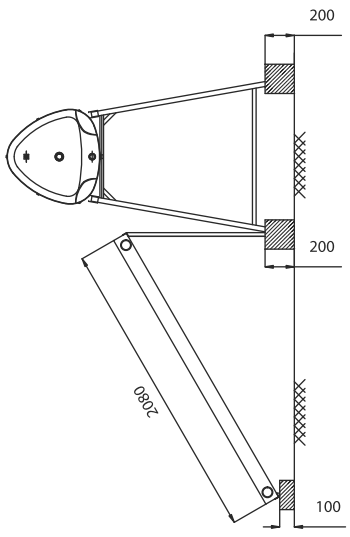
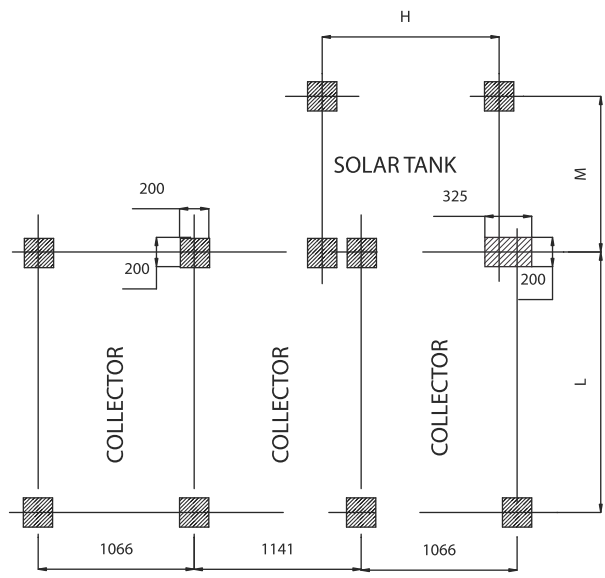


SIDE ELEVATION

FOUNDATION DETAILS FOR 200 LPD

ALL DIMENSIONS ARE IN MM

TILT ANGLE	" L "	" H "	" M "
30°	1780	1209	1064
40°	1572	1309	1164



FOUNDATION DETAILS FOR 300 LPD

ALL DIMENSIONS ARE IN MM

HEALTH, SAFETY & ENVIRONMENT INSTRUCTIONS & GUIDELINES FOR SOLAR THERMAL PRODUCTS / SYSTEMS

1.0 INTRODUCTION

Prior to commencement of installation / Usage of Solar thermal product /system ensure that all:

PERSONNEL involved with the installation / Usage of solar thermal System / Product have read this manual carefully / thoroughly and are familiar with the health and safety aspects of Solar Thermal Systems / products. Kindly preserve this manual and keep at an easily accessible place.

All our products / systems confirm to the specifications claimed by Tata BP Solar India Limited. You are requested to use the product / system in accordance with the User Manual and under normal conditions. Tata BP Solar India Limited Disclaims any liability for the damage which may result due to any one / all of the following



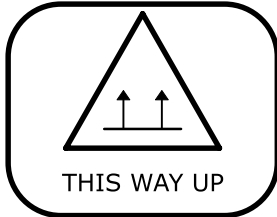
- ★ Non familiarization of caution / informative symbols pasted on the products / System
- ★ Improper use or use contrary to the instructions contained herein
- ★ Any attempt made to service or modify the product / System by the user. 
- ★ Any service / repair to the product / system attended by the user himself or any other person, either during warranty period or out of warranty period, other than TBP authorized / trained personnel.

2.0 HEALTH & SAFETY NOTICE

WARNING !

- ⤴ Solar thermal collector develops very high temperature. End connection / flanges must not be touched with bare hands.
- ⤴ Do not attempt to install solar thermal products / systems under high winds.
- ⤴ If system remains unused for a number of days, it can generate very high water temperatures above 70°C which can cause injury when comes in direct contact with human body.

3.0 CAUTION SYMBOLS THAT ARE NORMALLY USED AND EXPLANATIONS



ORIENTATION SYMBOL

Items marked with this symbol must be transported / installed in the Orientation shown.

4.0 SPECIFIC HEALTH SAFETY INSTRUCTIONS

COLLECTORS

- Before installation of solar thermal system over an existing building, make sure the addition of solar thermal product / system does not affect the existing building in terms of load bearing capability. The desired information like weight and size of Tata BP Solar's Product / System is available in the product specification and manual. Please contact TATA BP solar for any clarification / assistance.

CAUTION: Failure in carrying out the above task could affect the safety of the building over which Solar Hot Water System is planned to be installed.

INSULATED TANK

- Insulated tank stores hot water at high temperature.
- Do not attempt to lift the tanks by hand as they are heavy and could lead to physical injury. Use appropriate lifting techniques and material handling devices.
- Do not touch the tank inner or outer surface bare handed, it could lead to burn injury.
- While carrying out servicing of insulated tank, make sure the Pump (if applicable) and Control instruments (if applicable) are disconnected from 230V AC power source.
- Ensure the "GATE VALVE" provided in the cold water line is always open. Failure to this could lead to excessive temperature and pressure buildup in the tank and could lead to a potential safety hazard. Ensure the vent pipe is always kept open.

5.0 ENVIRONMENT

One of the most important focus in Tata BP SOLAR is the commitment to the environment. All Tata BP SOLAR activities are undertaken with the maximum possible respect for the environment. This together with efficient control of atmospheric emissions, effluents, residues, etc., guarantee the minimum impact possible to the environment, prior to the sale of our products.

In order to continue this commitment to the environment, it is hoped that the final consumer will work with us to ensure the safety and responsible disposal of the product at the end of its life cycle, after decades of operation.

Discard your used collector, tank, pump electronics and mechanical accessories in compliance with local environmental legislation.

In the event that the safe disposal of the product proves difficult, Tata BP Solar will accept the equipment returned to its premises. Tata BP Solar will then undertake to recycle or to dispose the product, in accordance with best environmental practices.

Please follow the instructions as below for ensuring no damages to the Environment.

- Do not expose internal parts of collector and tanks to unfavorable environment conditions (Rain, Dust, Sea wind etc.)
- If the Product is operated outside the specified environment, the product shall not meet the desired performance expectation.
- Do not attempt to open the collector, tank, pump and control electronics (as applicable). Do not throw them in the house hold rubbish.

WARRANTY

SOLAR WATER HEATING SYSTEMS

TERMS AND CONDITIONS :

- 1] This warranty is applicable and subjecting only to ZING solar water heating systems manufactured by TATA BP SOLAR INDIA LIMITED and sold by their authorized dealers.
- 2] This warranty shall apply only to manufacturing defects arising in the system or its part in ordinary course of its use. This warranty does not cover Rubber parts, Glass and other consumables, Sacrificial Anode & fasteners.
- 3] This warranty will be the sole and only remedy, either expressed or implied for our products.
- 4] This warranty card should have been given to the customer by us / our authorized representative - duly filled and stamped.
- 5] This warranty is confined to the first purchaser of the specified product only and it is not transferable.
- 6] The system supplied should have been installed by us / our authorized representative.
- 7] This warranty is valid for a period of 12 months from the date of installation or 15 months from the date of ex-works delivery, whichever expires first.
- 8] This certificate will be required to be presented to TATABP / Authorized service dealer for availing this warranty.
- 9] During the warranty period, and upon presenting this card, the system will be repaired free of charge by us / our authorized representative at our premises, provided the equipment which needs to be repaired is delivered by the customers to us / our authorized representative as the case may be & collected back after repairs.

TERMS AND CONDITIONS [continued] :

- 10] Our authorized representative may collect and deliver the equipment after repairs at actual cost of transportation and against specific request.
- 11] All warranty claims are governed by TATA BP SOLAR INDIA LTD's warranty policy.
- 12] On claims, decision of Tata BP Solar is final.
- 13] Disputes, if any shall be subject to Bangalore jurisdiction only.

THIS WARRANTY WILL NOT EXTEND TO THE FOLLOWING :

- 1] Damages caused to the system in course of its transportation or due to any accident.
- 2] Damages caused by fire, earthquake, flood or any other natural disasters.
- 3] If the system has not been installed / used in accordance with instructions given in the user manual.
- 4] Damages caused by improper or reckless use of the system.
- 5] Prior to giving the system to us / our authorized representative, if it is repaired or an attempt is made to repair or open the system in any manner by any other person or agency.
- 6] Damage caused by alteration, modification or conversion of any nature.
- 7] If the hardness of the water which is fed into the **ZING SERIES** system exceeds **300 PPM**.
- 8] If the hardness of the water which is fed into the **ZING HHC SERIES** system exceeds **1000 PPM**.
- 9] If the chloride / fluoride content in the water which is fed into the system [any type] exceeds **100 PPM**.

System Serial No.		Invoice No.		Customer's Signature
Model		Signature & seal of authorized Dealer/TBP representative		
Capacity				
No. of Collectors				
Date of purchase				

System Serial No.		Invoice No.		Customer's Signature
Model		Signature & seal of authorized Dealer/TBP representative		
Capacity				
No. of Collectors				
Date of purchase				

Manufactured By

TATA BP SOLAR INDIA LIMITED

Plot NO. 78, Electronics City, Hosur Road,
BANGALORE - 560 100, INDIA

Tel : 080-40702000

Fax : 080-40703119

Local Dealer